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SUCCESSFUL APPLICATIONS

OF

DR. S. FLEET SPEIR'S ARTERY  
CONSTRUCTOR.

BY

CHARLES A. HART, M. D.,

NEW-YORK,

ATTENDING SURGEON TO MANHATTAN DISPENSARY, MEMBER OF THE AMERICAN MEDICAL  
ASSOCIATION, FELLOW OF THE ACADEMY OF MEDICINE, MEMBER  
OF THE NEW YORK PATHOLOGICAL SOCIETY, ETC.

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## SUCCESSFUL APPLICATIONS OF DR. S. FLEET SPEIR'S ARTERY CONSTRICTOR.

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CASE I. *Amputation of the Leg*—J. S., aged fifty-five. On March 1st, received a contused wound on the crown of the head, about two inches long, extending down to the bone, from a stake in a bale of hay, which fell upon him. The wound was dressed by a druggist, who hermetically sealed it by straps of adhesive plaster. The injury being considered a trivial matter, the dressing was undisturbed for four days, when he began to experience pain in the wound, and called in his family attendant, who found that an erysipelas had invaded the entire cellular tissue of the scalp, converting it into a big bag of pus. He removed the plaster from the wound to evacuate the collection, and also made an incision about an inch in length over the right zygoma, to facilitate drainage. This, it was supposed, would be all that would be required, but on the evening of the sixth day intense pain began in the right foot, which lasted about ten hours, and then abated. The following morning, when his physician saw him, he found that the tissues of the dorsum of the foot were attacked by *gangræna senilis*. Three days after I was called in consultation, and finding the line of demarcation established, removed the slough, which was composed of all the tissues down to the bones, except the extensor tendons of the toes, which were in a sloughing condi-

tion. The metatarsal bones were all denuded of periosteum, and necrotic; the tarsal, metatarsal, and ankle-joints open. The bone of the skull at the site of injury was found denuded of periosteum to the extent of about the size of a silver quarter. To afford the bone a chance to recover without exfoliation, I made two counter-openings low down on the back of the head, and closed the original wound by paring the edges and bringing them together with silver sutures, the result proving entirely satisfactory.

Feeling confident that the destruction of the foot was due to some cause other than metastatic, from the condition of the head, which was offered by his physician in explanation, I made careful inquiry about any antecedent illness that he might have had, and was assured by him that he had not been ill a day since the age of eighteen, when he had a light attack of variola. He had never had either rheumatism or gout, nor was any organic change discoverable.

On March 9th, his general condition being favorable, I amputated at the juncture of the middle and lower third of the leg, by the modified circular method. Some trouble being experienced in compressing the artery in the groin with the tourniquet, the thumb of an assistant was substituted. A short time previous to this, Dr. Speir had presented his instrument to the notice of the New York Academy of Medicine and the Pathological Society, together with the specimens of the carotid arteries of two sheep, a horse, and a portion of the femoral artery of a boy that had suffered an amputation of the hip-joint at the hands of Dr. Spier. All of the vessels showing such a complete closure, and being so favorably impressed with the principle, I determined upon the first opportunity to test the value of the instrument, and so employed it in the above case, where I applied it to the anterior and posterior tibial arteries, with the effect of completely arresting all bleeding. The peroneal artery, however, was so closely adherent to the vein, that I found it impossible to separate them, and, fearing that the interposition of the latter vessels would interfere with the action of the constrictor, I attempted to apply a ligature; but the vessel was in such a calcareous condition that the ligature cut directly through the coats of the artery down to the vein.

The second ligature, which embraced some muscular fibres on the opposite side of the artery, succeeded in closing the vessel. When I examined the amputated portion, I was surprised to find the arteries so extensively diseased, being almost as friable as pipe-stem; this, however, verified my opinion as to there having been some other cause for the gangrene of the foot than the injury to the head, though doubtless that played no unimportant part as an exciting cause. Every thing progressed favorably up to the eighth day after the operation, when a condition simulating pyæmia was developed, but happily yielded to a tonic treatment. On the twenty-second day the ligature which I had placed on the peroneal artery came away, and *was followed by a hæmorrhage of about two ounces*. After this had ceased, I watched the patient for some time, but no recurrence taking place, I enjoined absolute quiet, in the hope that a clot would form without interference on my part; but in this I was disappointed, as his wife called at my office about eleven o'clock in the evening and stated that her husband had lost quite a quantity of blood, and was still bleeding when she left her home. I returned with her to her husband, and found the dressing of the stump saturated with arterial blood; he had lost, I should judge, about six ounces. I at once applied the tourniquet to the femoral artery in the thigh, which arrested the bleeding, and left him with the fear that I should be compelled before many hours to ligate or constrict the iliac artery. In this I was agreeably disappointed, as I had no further trouble, the tourniquet completely controlling the vessel, and not being removed until the stump was almost entirely healed; though the pressure was remitted after the third day.

CASE II. *Constriction of the Common Carotid Artery.*—Four days after the above case, I was invited by a professional friend from the West to assist him in a case of ligation of the common carotid artery of the left side, in a child thirteen months old, for a congenital pulsating nævus of the left side of the jaw, about the size of a small orange. This had been previously treated by means of hot needles, but without arresting the growth.

The artery having been exposed, my friend paid me the compliment of deciding between the ligature and the artery

constrictor, my decision being in favor of the constrictor. I was requested to apply it, and did so, arresting the pulsation of the tumor at once, and decreasing the size at least one-third; the division invagination of the internal coats of the artery was complete, while the external was uninjured, and lay like a flattened ribbon, in its sheath. The wound was completely closed in the usual manner, and primary union anticipated; but, owing to an attack of croup which supervened the night of the operation, was only obtained through about half of the wound. Since the operation I have been unable to obtain any details of the after-condition of the case beyond that given above, except that a perfect cure was obtained without any untoward accident.

CASE III. *Ovariectomy*.—May 30th, Dr. T. A. Emmet operated upon an ovarian tumor which was extensively adherent to the omentum and intestines. While separating the adhesions, a small artery of the omentum was lacerated and bled pretty freely. Being present at the operation, Dr. Emmet requested me to apply the constrictor to the vessel, in preference to a ligature, which I did. Notwithstanding the delicacy of the coats of the artery, the current of blood was completely arrested, and the invagination of the internal coats was visible to the extent of half an inch, while the delicate external coat remained uninjured. The portion of the omentum containing the artery I held for some time, in case of a return of the bleeding, to afford Dr. Emmet an opportunity to ligate it; but, no bleeding occurring, it was deemed safe by Dr. Emmet to return it to the abdominal cavity without further interference. Death occurred about sixty hours after the operation, the patient never having rallied from the shock due to the extensive pelvic and visceral adhesions. The autopsy was made about twelve hours after death. No blood was found in the abdominal cavity, nor could the vessel to which the constrictor had been applied be found, although carefully sought after.

CASE IV. *Amputation at the Hip-Joint*.—Besides the above cases, the instrument has been successfully applied to the following amputation at the hip-joint, October 8, 1870, to a boy who was run over by a street car, and taken to the Brooklyn City Hospital, where he suffered an amputation of

the hip-joint at the hands of Dr. S. F. Speir, who, after making the anterior flap, applied the constrictor to the femoral and profunda artery, the effect of which was to arrest the hæmorrhage entirely. The vessels were left in this condition until the operation was completed, except the closing of the stump—all this time the arteries could be seen pulsating in the wound. As this was the first application to a human subject, and the case one which might involve litigation, the doctor was “induced to apply ligatures and close the wound as usual in such cases.”—(*Medical Record*, April 1, 1871.)

CASE V. *Amputation of the Thigh*.—December 12, 1871, Dr. D. E. Kissam amputated at the thigh in a case of threatened gangrene following a compound comminuted fracture of the leg, in a man aged fifty-four. Dr. Speir, at the request of the operator, “constricted the femoral artery, which was the only vessel exposed, and the femoral vein, which bled more than usual. The result gave the same satisfaction as in the other cases.” The wound was then closed in the usual manner. The condition of the patient being bad, and the reaction after the operation difficult, but little hope was entertained of his recovery, a condition of things which created considerable anxiety as to whether this might not prove too severe a test for the constricted artery. Finally, gangrene set in in the stump, notwithstanding which, and the open condition of the wound which followed such a condition, there was no hæmorrhage. The patient died three days and sixteen hours after the amputation. The artery was removed from the stump, and was found perfectly closed by the invaginated internal and middle coats, and a firm clot, as represented in Fig. 7.—(*Medical Record*, April 1, 1871.)

For the notes of the following cases I am indebted to Dr. Speir :

CASE VI. *Popliteal Aneurism*.—N. S., aged twenty-five, was admitted to the Brooklyn City Hospital, April, 1871, with a popliteal aneurism of the right limb, the result of an injury. Considerable œdema of the leg and foot existed; the leg was bent at a right angle to the thigh.

*April 22d.*—Treatment at present, opiates to relieve pain. Urine drawn off with the catheter. Knee swollen, tender,



and very decided pulsation posteriorly and laterally, controlled by pressure on the femoral artery.

*April 26th.*—It having been decided, after consultation, to apply the “artery constrictor” to the femoral artery in Scarpa’s space, Dr. Speir cut down upon the vessel, and, after separating the artery, constricted it. All pulsation in the tumor ceased at once; after the removal of the instrument the vessel was found perfectly occluded. The wound was closed with silver sutures and adhesive plaster, and an intermitting digital pressure kept up for a time, with the view to produce a large and firm coagulum in the vessel.

*April 27th.*—A large part of the wound appeared to be united by the first intention. One point, however, appears to be irritated by the adhesive straps where they were irregularly applied.

*April 29th.*—Some suppuration from the point of the wound above indicated, one of the sutures removed to-day. There has been no pulsation in the tumor since the operation. The leg has decreased in size; still keeps at right angles to the thigh. Temperature good. He has but little pain in the limb.

*May 3d.*—The point from which there was suppuration now discharges but little; the rest of the wound has united by primary adhesion.

*May 12th.*—The wound is entirely healed. The patient can straighten the limb, and sit up in bed. The swelling has disappeared from the limb, with the exception of a small, hard tumor in the popliteal space. There is no pain, and the case is considered cured.

CASE VII. *Amputation of the Breast.*—On the 20th of November last Dr. D. E. Kissam amputated the breast for cancer, in a patient thirty-eight years of age. But one vessel of sufficient size to require attention was exposed; to this Dr. Speir (by invitation) applied the constrictor. The instrument which he had at hand being rather large, he included a portion of the pectoral muscle. The bleeding was at once arrested, the wound was closed in the usual manner, and united *by first intention*, the patient being about her room after a few days.

The following cases were reported before the New York Library and Journal Association by Dr. Speir, November 17th:

CASE VIII. *Amputation at the Ankle-joint by Dr. Kissam.*—In this case there was secondary bleeding, which could not fairly be attributed to the use of the constrictor, for, on searching the wound for the bleeding-point, the internal plantar artery was found perfectly closed. The anterior tibial artery (which seemed at first to be the source of the secondary bleeding, and which had received severe bruising after its constriction) being tied above the point of constriction. The bleeding still continued, showing that the secondary hæmorrhage was in great part from the vessels which had not been constricted, and which had not bled at the time the wound was closed after the operation.

CASE IX. *Amputation of the Forearm.*—In this case Dr. Speir applied the constrictor on one side and the ligature on the other, and obtained a primary union on the side where the constrictor was used, and a prolonged union by granulations on the side of the ligature.

CASE X. *Amputation of the Leg.*—August 19th, Dr. Kissam amputated a leg for a gangrenous condition following a severe compound fracture. Dr. Speir closed the two tibial arteries with the constrictor. The gangrenous condition extending after the operation, the patient died, on the sixth day after the amputation, of pyæmia. No accident occurred from the vessels, notwithstanding the unfavorable condition of the stump.

CASE XI. *Popliteal Aneurism.*—August 26th, Dr. D. E. Kissam operated upon a popliteal aneurism at the Brooklyn City Hospital. He had first tried compression and flexion, without avail. The application of the constrictor to the femoral artery was followed by immediate relief from pain, and a perfect cure of the aneurism. In this case there was no union by first intention. The patient was a mulatto, fifty years of age, of a cachectic and broken-down appearance. The 5th of December he left the hospital cured.

In all of the cases contained in this paper it will be noticed that but two occurred which at the time of the operation presented any thing like favorable conditions for the applica-

tion of any method which would be likely to control the vessels permanently through their progress to recovery or death. In the first case cited, the vessels were in an extreme state of disease, and one of such a character as to excite very grave fears on the part of any surgeon for the recovery of his patient. It also furnishes a good example of the relative merits of the ligature and the artery constrictor, and demonstrating the superiority of the latter method over the former, *as secondary hæmorrhage occurred from the vessel to which the ligature had been applied, while the constricted vessels remained closed.* Case II., I had hoped, would have proved another advantage, viz., by the wound closing entirely by primary adhesion. This was partially obtained, and I have no doubt would have been perfect, had not the attack of croup, which was developed the night of the operation, prevented. The cure of the case, however, was accomplished. Case III. demonstrated how groundless is one of the objections urged against this instrument by some of the older surgeons, viz., that "the force employed would divide the external coat of an artery, or at least injure it so as to cause it to slough;" in this case the artery belonged to the most delicate class, and, notwithstanding it was drawn into the sheath of the instrument to the extent of between a quarter and half an inch, with sufficient force to divide and invaginate the internal coats, the external remained uninjured. Its position, also, was one favorable to any consecutive bleeding, being in loose floating tissues, and unsupported by the pressure of any dressing. How the above objection could be urged against the use of the constrictor by practical surgeons, I can hardly understand, for a moment's reflection on the anatomical construction of arteries should preclude such an objection, as every professional man of any surgical experience can hardly fail to know that the external coat, composed as it is of connective tissue and elastic fibres, is extremely tough and resistant. As to the force used in the application of the instrument, it is far less in reality than that exerted by the ligature, and which is, I may say, always much more of a cutting instrument, from the fact of the ligature being much smaller in circumference than the beak or hook of the constrictor. The ligature, again, is fre-



quently applied with such force as to break, even though generally composed of good, firm silk, while the cutting through of a vessel by it is far from common. The notes of the cases furnished me by Dr. Speir all speak favorably for the method. In one case complete union by first intention was obtained; in two others a partial primary union. One of these, I have very little doubt, would have united by first intention, had a ligature not been present in the wound. The valuable practical points which this method presents over the ligature, and which, I think, is to some extent demonstrated by the cases contained in this paper, are :

1. *Its greater certainty of permanently controlling arteries in a healthy condition, as well as, in extreme states of disease.*

2. *The wound being free from any absorbing or retaining agent like the ligature in which discharges can decompose, there is less liability to septæmic poisoning.*

3. *The wound being entirely free from any foreign body, there will be a greater probability of obtaining primary union, and which we can materially assist by hermetic closure of even as large wounds as in amputation of the thigh, by covering the entire stump with collodion.*

4. *Far less liability to secondary hæmorrhage when applied to a vessel in its course. Should the invagination of the coats or clots give way, the current of blood will simply flow on in the old channel, and not exsanguinate the patient as in secondary hæmorrhage after the ligature.*



*of the author*

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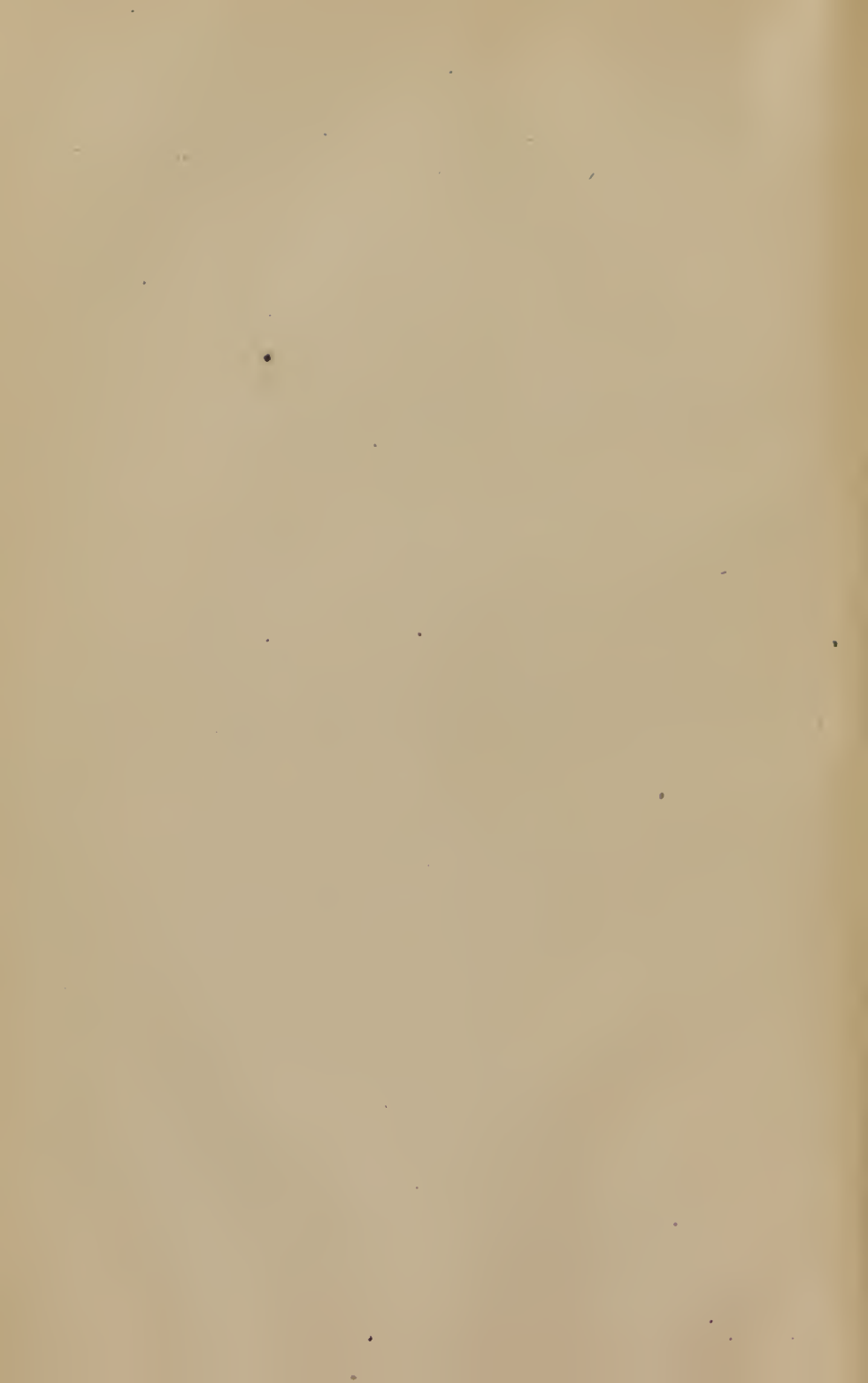
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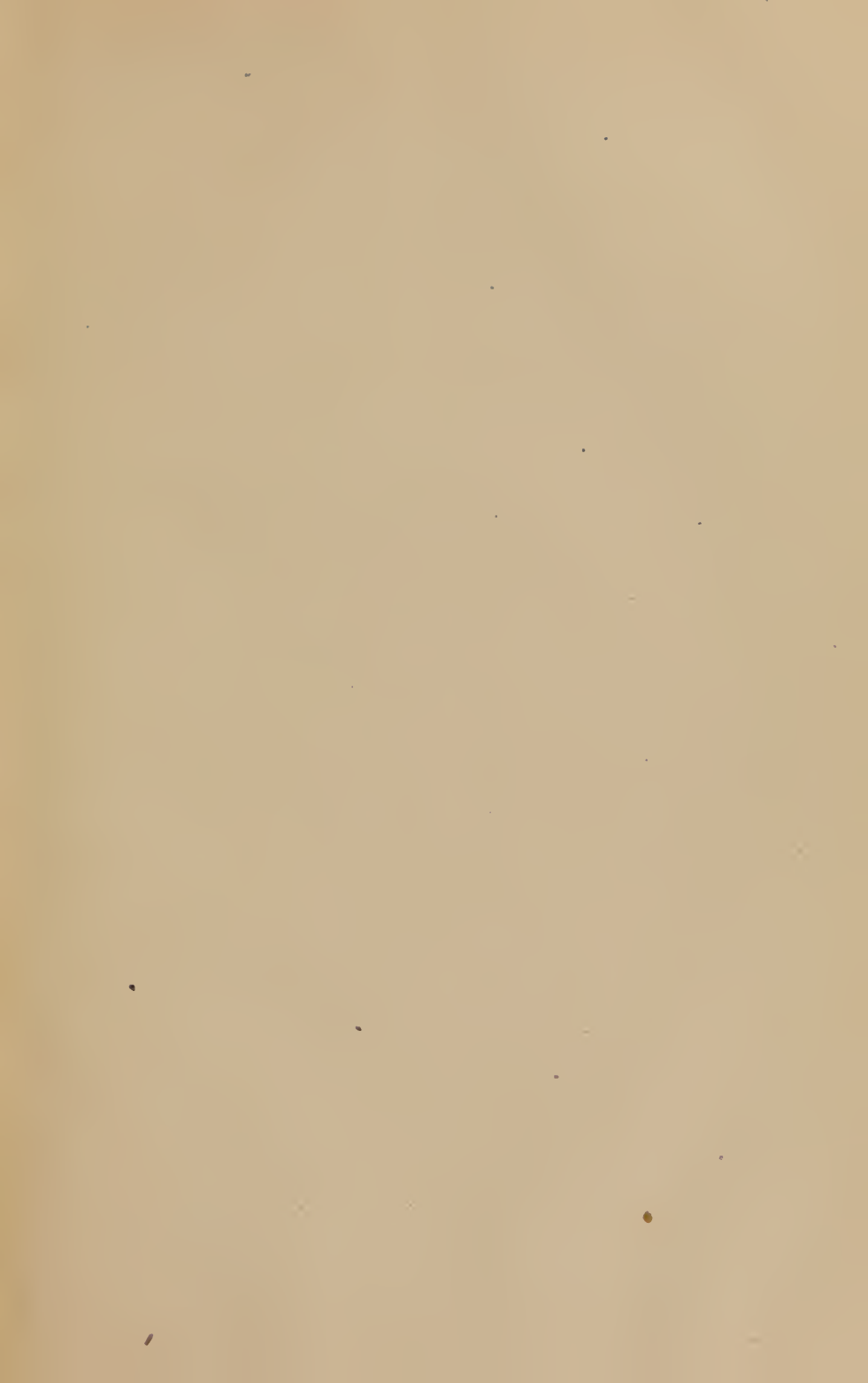


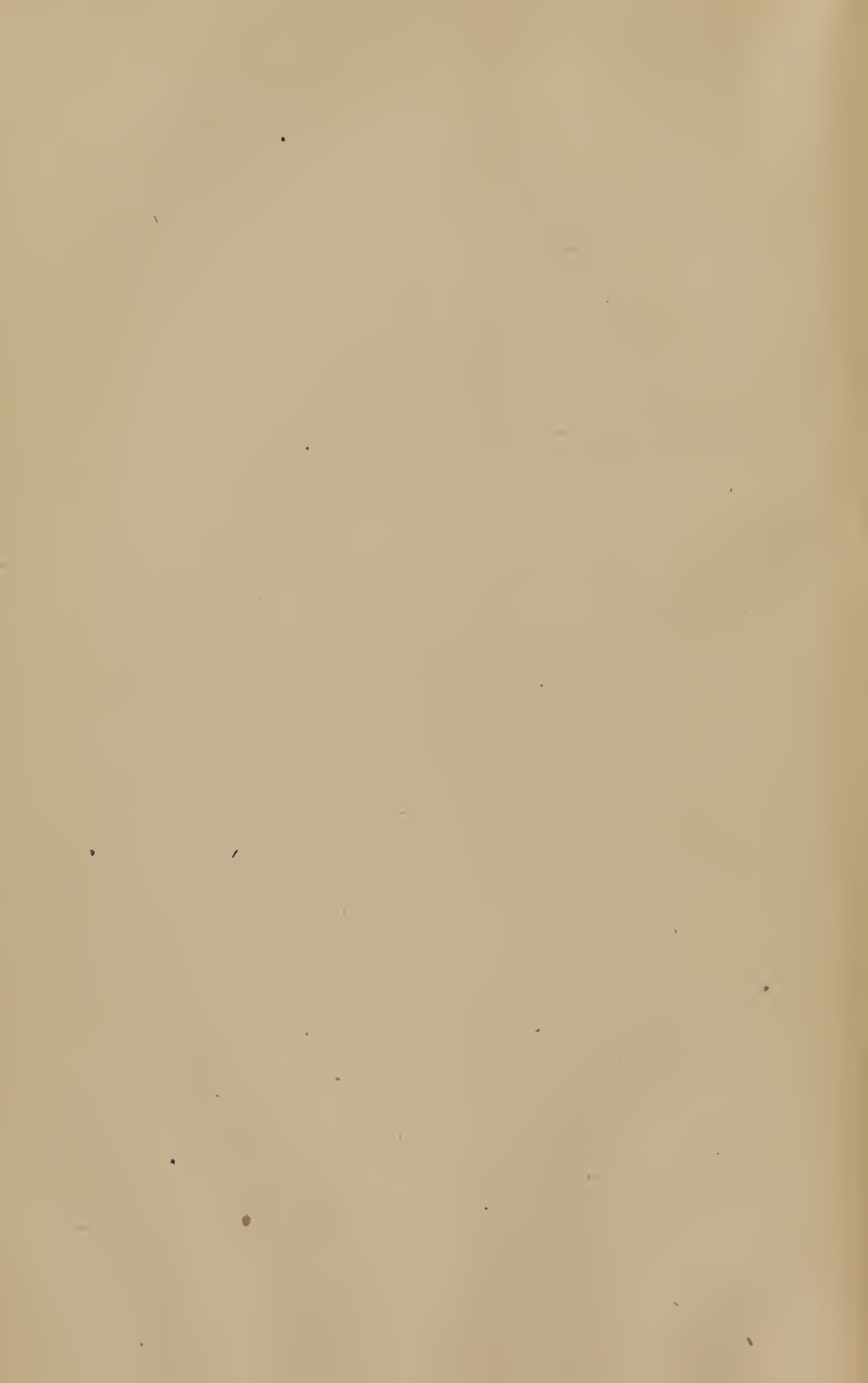
















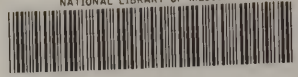








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